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10/502,245	12/29/2004	Eleni Berdermann	930008-2183	5386

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EXAMINER	
BOOSALIS, FANI POLYZOS	
ART UNIT	PAPER NUMBER
2884	

DATE MAILED: 10/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/502,245	BERDERMANN ET AL.	
	Examiner	Art Unit	
	Faye Boosalis	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10-13,15,16 and 18* is/are rejected.

7)☒ Claim(s) *9,14,16,17 and 27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/22/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kitamura et al (US 5,717,214 A)* in view of *Kozlov et al (US 3,665,193).*

Regarding claim 1, Kitamura discloses a detector for detecting high-intensity and high-energy particle beam, which comprises a crystalline semi-conductor plate (12) having metal coating (14) (see Fig. 5 and col. 12, lines 55-64) and which is arranged on a substrate (col. 16, lines 56-59), wherein the semi-conductor plate (12) is a diamond plate which is coated on both faces with metal structures (23)(23a)(24)(24a), comprising electrodes which are arranged to be connected to various electrical potentials by way of conductor tracks on the substrate, and the substrate comprising a ceramic plate (col. 16, lines 56-59), having a central orifice (22) (which is covered by the diamond plate (col. 18, lines 60-67). Kitamura does not disclose the diamond plate being coated by a metal structure comprising aluminum or an aluminum alloy. Kozlov discloses a diamond nuclear radiation detector wherein the diamond crystal plate is coated with aluminum (col. 1, lines 75-76 and col. 2, lines 1-2). Kozlov teaches doping the surface layer of the plate with boron, aluminum, phosphorus, lithium and carbon and the formation of the blocking and injecting contacts is secured not only by using said

materials, but also with the aid of applying to it the potential of appropriate polarity, as well as owing to the damage of the surface crystalline structure of the plate, such as in the case of doping (col. 1, lines 75-76 and col. 2, lines 1-2). Therefore, it would have been obvious to modify the detector disclosed by Kitamura, to include an aluminum metal structure, as disclosed supra by Kozlov, to allow for a more versatile apparatus.

Regarding claim 2, Kozlov discloses the metal structure on the upper and lower face (2)(3) of the diamond plate (1) form two unstructured continuous metal layers, the metal layers of the lower face having a ground potential an the metal layer of the upper face being provided with a potential at which the diamond plate (1) has a field strength in the range of .5 to 5 volts per micrometer (col. 3, lines 5-17).

Regarding claims 3-4, Kozlov discloses the metal structures on the upper face and on the lower face of the diamond plate have a non-metalised peripheral region (col. 2, lines 20-24).

3. Claims 5-8 and 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kitamura et al (US 5,717,214 A)* and *Kozlov et al (US 3,665,193)* as applied to claim 1 above, and further in view of *Krammer et al ("CVD diamond sensors for charged particle detection").*

Regarding claim 5, Kitamura discloses a detector for detecting high-intensity and high-energy particle beam, which comprises a crystalline semi-conductor plate (12) having metal coating (14) (see Fig. 5 and col. 12, lines 55-64) and which is arranged on a substrate (col. 16, lines 56-59), wherein the semi-conductor plate (12) is a diamond plate which is coated on both faces with metal structures (23)(23a)(24)(24a), comprising

electrodes which are arranged to be connected to various electrical potentials by way of conductor tracks on the substrate, and the substrate comprising a ceramic plate (col. 16, lines 56-59), having a central orifice (22) (which is covered by the diamond plate (col. 18, lines 60-67). Kozlov discloses a diamond nuclear radiation detector wherein the diamond crystal plate is coated with aluminum (col. 1, lines 75-76 and col. 2, lines 1-2). Neither Kitamura nor Kozlov disclose microscopically small contact surfaces or metal strips. Krammer discloses the metal surface of the diamond plate has metal strips which are connected by way of bonding wires on the substrate to external connections of the detector (page 1779, Section 3. Strip detectors and Fig. 1). Krammer teaches using electronics with fast shaping time leads to much higher electronic noise, reducing the signal/noise ratio of the detector (page 1780, Section 3. Strip detectors). Therefore, it would have been obvious to modify the detector disclosed by Kitamura and Kozlov, to include metal strips, as disclosed supra by Krammer, to allow for a more versatile apparatus.

Regarding claim 6, Krammer discloses the metal structure comprise a grid network (x-y planes) of metal strips, the metal strips of the lower face of the diamond plate arranged at a right angle to the metal strips of the upper face of the diamond plate (page 1780, Section 3. Strip detectors).

Regarding claim 7, Krammer discloses the substrate has contact surfaces which are connected to external connections of the detector (page 1779, Section 3. Strip detectors and Fig. 1).

Regarding claim 8, Kitamura discloses the detector has a carrier frame (10) which its detector components are fixed (See Generally Fig. 10 and col. 12, lines 58-68).

Regarding claim 10, Kitamura discloses the orifice (22) in the substrate is virtually tetragonal (See Fig. 12B and col. 18, lines 60-67).

Regarding claims 11-12, Kitamura discloses the diamond plate (21) formed by chemical gas phase deposition and having a thickness in the range from 10 μm to 1000 μm (col. 20, lines 9-11).

Regarding claim 13, Krammer discloses the ceramic plate has printed thin-film or thick-film conductors as interwiring lines (metal strips) and passive components in thin-film or thick-film technology (page 1779, Section 3. Strip detectors and Fig. 1).

4. Claim 15, 18-26 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Kitamura et al (US 5,717,214 A)* in view of *Krammer et al ("CVD diamond sensors for charged particle detection").*

Regarding claim 15, Kitamura discloses a method for the production of a detector for detecting high-intensity and high-energy particle beams, which detector comprises a crystalline semi-conductor plate (12) having a metal coating (14) (see Fig. 5 and col. 12, lines 55-64) and which detector is arranged on a substrate (col. 16, lines 56-59), the method comprising the following method steps: provision of a substrate plate (col. 16, lines 56-59), chemical gas phase deposition, on the substrate plate of a diamond layer of carbon (col. 20, lines 9-11), removing the substrate plate from the diamond layer to form a self-supporting diamond plate (12) (col. 18, lines 60-67), coating the upper face

and reverse face of the diamond plate (12) with metal structures (23)(23a)(24)(24a) (col. 16, lines 56-59), producing of a ceramic plate having a central orifice (12) (col. 18, lines 60-67), mounting the diamond plate (12), metallised on both sides, on the ceramic plate, the central orifice is covered (col. 16, lines 56-59), connecting the metal structure of the diamond plate to the metal layers on the ceramic plate (col. 16, lines 56-59), and fixing the detector components on a carrier frame (See Generally Fig. 10 and col. 12, lines 58-68). Kitamura discloses not disclose the ceramic plate having interwiring lines or conductor tracks having contact connection surfaces or passive components. Krammer discloses the ceramic plate has printed thin-film or thick-film conductors as interwiring lines (metal strips) and passive components in thin-film or thick-film technology (page 1779, Section 3. Strip detectors and Fig. 1). Krammer teaches using electronics with fast shaping time leads to much higher electronic noise, reducing the signal/noise ratio of the detector (page 1780, Section 3. Strip detectors). Therefore, it would have been obvious to modify the detector disclosed by Kitamura, to include metal strips, as disclosed supra by Krammer, to allow for a more versatile apparatus.

Regarding claims 18-19, Kitamura discloses method wherein the substrate plate is dissolved and removed from the diamond layer (21) (col. 18, lines 60-67).

Regarding claims 20-21, Kitamura discloses method wherein for coating of the upper face and reverse face of the diamond plate (21) with a metal layer a sputtering method employing a mask (27) is used (col. 19, lines 53-67).

Regarding claim 22, Kitamura discloses method for coating the upper face and reverse face of the diamond plate (12) with a metal structure (23)(23a)(24)(24a) (col. 16, lines 56-59).

Regarding claim 23, Krammer discloses method for coating the upper face and reverse face of the diamond plate with a metallic strip pattern (page 1780, Section 3. Strip detectors).

Regarding claim 24, Krammer discloses method wherein contact connection surfaces and/or passive components on the ceramic plate (substrate) used in thin-film or thick film methods (page 1779, Section 3. Strip detectors and Fig. 1).

Regarding claim 25, Krammer discloses the method wherein for connection of the metal structures of the diamond plate to interwiring lines (metal strips) on the ceramic plate (substrate) there is used a bonding material (page 1779, Section 3. Strip detectors and Fig. 1).

Regarding claim 26, Kitamura discloses method for fixing of the detector component on a carrier frame (10) a metallic holding frame is provided which, holding frame at the same time establishing a connection on the ceramic plate (See Generally Fig. 10 and col. 12, lines 58-68).

Allowable Subject Matter

5. Claims 9, 14, 16-17 and 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding dependent claim 9, the prior art does not disclose or fairly suggest a detector for detecting high-intensity and high-energy particle beam wherein the detector is arranged in a detector housing being electrically connected by way of an elastomeric conductive buffer of conductive rubber to the detector housing.

Regarding dependent claims 14 and 27, the prior art does not disclose or fairly suggest a beam apparatus for high-intensity particle beams having 10^5 to 10^{13} particles per pulse packet, preferably having 10^5 to 10^{13} particles per pulse packet.

Regarding dependent claims 16-17, the prior art does not disclose or fairly suggest a method for production of a detector for detecting high-intensity and high energy particle beams wherein the chemical gas phase deposition of a diamond layer of carbon on the substrate plate comprises hydrogen together with 0.2 to 2% by vol. methane.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Faye Boosalis whose telephone number is 571-272-2447. The examiner can normally be reached on Monday thru Friday from 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

8. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

FB

OTILIA GABOR
PRIMARY EXAMINER